Code:

```
/* create database bookstore*/ CREATE DATABASE bookstore;

/* Use bookstore database*/ USE bookstore;

/* Entity */
CREATE TABLE Author(

author_id int not null, author_name varchar(255), author_birth date,
primary key (author_id)

);

CREATE TABLE Book( book_id int not null,

book_name varchar(255), price Double,
isbn varchar(255), primary key (book_id)

);

CREATE TABLE Bookstore(
store_address varchar(255) not null, store_name varchar(255),
primary key (store_address)

);

CREATE TABLE Customer( customer_id int not null,

customer_name varchar(255),

primary key (customer_id) );

CREATE TABLE Publisher(
publisher_address varchar(255) not null, publisher_name varchar(255),
primary key (publisher_address)

);

CREATE TABLE Salesman( salesman_id int not null,

salesman_name varchar(255),

primary key (salesman_id) );

/* Relation */
```

```
CREATE TABLE Has ( book_id int not null,

store_address varchar(255) not null,

primary key (book_id, store_address),
foreign key (book_id) references Book(book_id),
foreign key (store_address) references Bookstore(store_address)

);

CREATE TABLE Buy ( book_id int not null,

customer_id int not null, buy_date date,

primary key (book_id, customer_id),
foreign key (book_id) references Book(book_id),
foreign key (customer_id) references Customer(customer_id)

);

CREATE TABLE Sell(
salesman_id int not null,

book_id int not null,

primary key (salesman_id, book_id),
foreign key (salesman_id) references Salesman(salesman_id), foreign key (book_id) references
Book(book_id)

);

CREATE TABLE Work ( salesman_id int not null,

store_address varchar(255) not null, since date,

primary key (salesman_id, store_address),
foreign key (salesman_id) references Salesman(salesman_id), foreign key (store_address) references
Bookstore(store_address)

);

CREATE TABLE Publish( book_id int not null,

publisher_address varchar(255) not null, publish_date DATE,
```

primary key (book_id, publisher_address),
foreign key (book_id) references Book(book_id),
foreign key (publisher_address) references Publisher(publisher_address) on delete cascade

);

CREATE TABLE Writes (book_id int not null,

author_id int not null, writes_year int,

primary key (book_id, author_id),
foreign key (book_id) references Book(book_id), foreign key (author_id) references Author(author_id)

);

/*insect data into author table*/

INSERT INTO `bookstore`.`author` (`author_id`, `author_name`, `author_birth`) VALUES ('001', 'Pete Souza', '2001-01-01');

INSERT INTO `bookstore`.`author` (`author_id`, `author_name`, `author_birth`) VALUES ('002', 'Ray Dalio', '2002-02-02');

INSERT INTO `bookstore`.`author` (`author_id`, `author_name`, `author_birth`) VALUES ('003', 'JK Rowling', '2003-03-03');

INSERT INTO `bookstore`.`author` (`author_id`, `author_name`, `author_birth`) VALUES ('004', 'RJ Palacio', '2004-04-04');

INSERT INTO `bookstore`.`author` (`author_id`, `author_name`, `author_birth`) VALUES ('005', 'Jeff Kinney', '2005-05-05');

INSERT INTO `bookstore`.`author` (`author_id`, `author_name`, `author_birth`) VALUES ('006', 'RH Sin', '2006-06-06');

INSERT INTO `bookstore`.`author` (`author_id`, `author_name`, `author_birth`) VALUES ('007', 'Walter Isaacson', '2007-07-07');

INSERT INTO `bookstore`.`author` (`author_id`, `author_name`, `author_birth`) VALUES ('008', 'Adam Gasiewski', '2008-08-08');

INSERT INTO `bookstore`.`author` (`author_id`, `author_name`, `author_birth`) VALUES ('009', 'Wizards RPG Team', '2009-09-09');

INSERT INTO `bookstore`.`author` (`author_id`, `author_name`, `author_birth`) VALUES ('010', 'Oprah Winfrey', '2010-10-10');

/*insect data into book table*/

INSERT INTO `bookstore`.`book` (`book_id`, `book_name`, `price`, `isbn`) VALUES ('001', 'Obama: An Intimate Portrait', '30.00', '0316512583');

INSERT INTO `bookstore`.`book` (`book_id`, `book_name`, `price`, `isbn`) VALUES ('002', 'Principles: Life and Work', '11.47', '1501124021');

INSERT INTO `bookstore`.`book` (`book_id`, `book_name`, `price`, `isbn`) VALUES ('003', 'Harry Potter', '111.83', '0545044251');

INSERT INTO `bookstore`.`book` (`book_id`, `book_name`, `price`, `isbn`) VALUES ('004', 'Wonder', '6.37', '0375869026');

INSERT INTO `bookstore`.`book` (`book_id`, `book_name`, `price`, `isbn`) VALUES ('005', 'Dairy of a Wimpy', '7.50', '1419725459');

INSERT INTO `bookstore`.`book` (`book_id`, `book_name`, `price`, `isbn`) VALUES ('006', 'I hope this reaches her in time', '2.93', '1979772304');

INSERT INTO `bookstore`.`book` (`book_id`, `book_name`, `price`, `isbn`) VALUES ('007', 'Leonardo da Vinci', '14.88', '1501139150');

INSERT INTO `bookstore`.`book` (`book_id`, `book_name`, `price`, `isbn`) VALUES ('008', 'Milk and Vine', '3.79', '1973124262');

INSERT INTO `bookstore`.`book` (`book_id`, `book_name`, `price`, `isbn`) VALUES ('009', 'Xanathar\'s Guide to Everything', '29.97', '0786966114');

INSERT INTO `bookstore`.`book` (`book_id`, `book_name`, `price`, `isbn`) VALUES ('010', 'The Wisdom of Sundays', '16.79', '125138060');

/*insect data into bookstore table*/

INSERT INTO `bookstore`.`bookstore` (`store_address`, `store_name`) VALUES ('49 Ocean Ave, San Francisco, CA 94113', 'Walliam\'s Bookstore');

INSERT INTO `bookstore`.`bookstore` (`store_address`, `store_name`) VALUES ('2170 33RD AVE, San Francisco, CA 94116', 'Hans\' Bookstore');

/*insect data into customer table*/

INSERT INTO `bookstore`.`customer` (`customer_id`, `customer_name`) VALUES ('001', 'Zhenru Huang');

INSERT INTO `bookstore`.`customer` (`customer_id`, `customer_name`) VALUES ('002', 'Bo Li');

INSERT INTO `bookstore`.`customer` (`customer_id`, `customer_name`) VALUES ('003', 'Jianhao Zhong');

INSERT INTO `bookstore`.`customer` (`customer_id`, `customer_name`) VALUES ('004', 'Shenliang Wang');

INSERT INTO `bookstore`.`customer` (`customer_id`, `customer_name`) VALUES ('005', 'Wentou Ge');

/*insect data into publisher table*/

INSERT INTO `bookstore`.`publisher` (`publisher_address`, `publisher_name`) VALUES ('256 Orizaba AVE, San Francisco, CA 94115', 'Bo\'s Publisher');

INSERT INTO `bookstore`.`publisher` (`publisher_address`, `publisher_name`) VALUES ('1447 Taraval Street, San Francisco, CA94116', 'Marco\'s Publisher');

/*insect data into salesman table*/
INSERT INTO `bookstore`.`salesman` (`salesman_id`, `salesman_name`) VALUES ('001', 'Jack Ma'); INSERT INTO `bookstore`.`salesman` (`salesman_id`, `salesman_name`) VALUES ('002', 'Leo Wang'); INSERT INTO `bookstore`.`salesman` (`salesman_id`, `salesman_name`) VALUES ('003', 'Hans Huang'); INSERT INTO `bookstore`.`salesman` (`salesman_id`, `salesman_name`) VALUES ('004', 'Allen Zhong'); INSERT INTO `bookstore`.`salesman` (`salesman_id`, `salesman_name`) VALUES ('005', 'Orane Huang');

/*insect data into buy table*/

INSERT INTO `bookstore`.`buy` (`book_id`, `customer_id`, `buy_date`) VALUES ('001', '005', '2011-01-01');

INSERT INTO `bookstore`.`buy` (`book_id`, `customer_id`, `buy_date`) VALUES ('002', '004', '2012-02-02');

INSERT INTO `bookstore`.`buy` (`book_id`, `customer_id`, `buy_date`) VALUES ('003', '003', '2013-03-03');

INSERT INTO `bookstore`.`buy` (`book_id`, `customer_id`, `buy_date`) VALUES ('004', '002', '2014-04-04');

INSERT INTO `bookstore`.`buy` (`book_id`, `customer_id`, `buy_date`) VALUES ('005', '001', '2015-05-05');

/*insect data into has table*/

INSERT INTO `bookstore`.`has` (`book_id`, `store_address`) VALUES ('001', '2170 33RD AVE, San Francisco, CA 94116');

INSERT INTO `bookstore`.`has` (`book_id`, `store_address`) VALUES ('002', '2170 33RD AVE, San Francisco, CA 94116');

INSERT INTO `bookstore`.`has` (`book_id`, `store_address`) VALUES ('003', '2170 33RD AVE, San Francisco, CA 94116');

INSERT INTO `bookstore`.`has` (`book_id`, `store_address`) VALUES ('004', '2170 33RD AVE, San Francisco, CA 94116');

INSERT INTO `bookstore`.`has` (`book_id`, `store_address`) VALUES ('005', '2170 33RD AVE, San Francisco, CA 94116');

INSERT INTO `bookstore`.`has` (`book_id`, `store_address`) VALUES ('006', '49 Ocean Ave, San Francisco, CA 94113');

INSERT INTO `bookstore`.`has` (`book_id`, `store_address`) VALUES ('007', '49 Ocean Ave, San Francisco, CA 94113');

INSERT INTO `bookstore`.`has` (`book_id`, `store_address`) VALUES ('008', '49 Ocean Ave, San Francisco, CA 94113');

INSERT INTO `bookstore`.`has` (`book_id`, `store_address`) VALUES ('009', '49 Ocean Ave, San Francisco, CA 94113');

INSERT INTO `bookstore`.`has` (`book_id`, `store_address`) VALUES ('010', '49 Ocean Ave, San Francisco, CA 94113');

/*insect data into publish table*/

INSERT INTO `bookstore`.`publish` (`book_id`, `publisher_address`, `publish_date`) VALUES ('1', '1447 Taraval Street, San Francisco, CA94116', '1991-01-01');

INSERT INTO `bookstore`.`publish` (`book_id`, `publisher_address`, `publish_date`) VALUES ('2', '1447 Taraval Street, San Francisco, CA94116', '1992-02-02');

INSERT INTO `bookstore`.`publish` (`book_id`, `publisher_address`, `publish_date`) VALUES ('3', '1447 Taraval Street, San Francisco, CA94116', '1993-03-03');

INSERT INTO `bookstore`.`publish` (`book_id`, `publisher_address`, `publish_date`) VALUES ('4', '1447 Taraval Street, San Francisco, CA94116', '1994-04-04');

INSERT INTO `bookstore`.`publish` (`book_id`, `publisher_address`, `publish_date`) VALUES ('5', '1447 Taraval Street, San Francisco, CA94116', '1995-05-05');

INSERT INTO `bookstore`.`publish` (`book_id`, `publisher_address`, `publish_date`) VALUES ('6', '256 Orizaba AVE, San Francisco, CA 94115', '1996-06-06');

INSERT INTO `bookstore`.`publish` (`book_id`, `publisher_address`, `publish_date`) VALUES ('7', '256 Orizaba AVE, San Francisco, CA 94115', '1997-07-07');

INSERT INTO `bookstore`.`publish` (`book_id`, `publisher_address`, `publish_date`) VALUES ('8', '256 Orizaba AVE, San Francisco, CA 94115', '1998-08-08');

INSERT INTO `bookstore`.`publish` (`book_id`, `publisher_address`, `publish_date`) VALUES ('9', '256 Orizaba AVE, San Francisco, CA 94115', '1999-09-09');

INSERT INTO `bookstore`.`publish` (`book_id`, `publisher_address`, `publish_date`) VALUES ('10', '256 Orizaba AVE, San Francisco, CA 94115', '2000-10-10');

/*insect data into sale table*/
INSERT INTO `bookstore`.`sell` (`salesman_id`, `book_id`) VALUES ('5', '1'); INSERT INTO `bookstore`.`sell` (`salesman_id`, `book_id`) VALUES ('4', '2'); INSERT INTO `bookstore`.`sell` (`salesman_id`, `book_id`) VALUES ('3', '3'); INSERT INTO `bookstore`.`sell` (`salesman_id`, `book_id`) VALUES ('2', '4'); INSERT INTO `bookstore`.`sell` (`salesman_id`, `book_id`) VALUES ('1', '5');

/*insert data into work table*/

INSERT INTO `bookstore`.`work` (`salesman_id`, `store_address`, `since`) VALUES ('1', '2170 33RD AVE, San Francisco, CA 94116', '2008-12-01');

INSERT INTO `bookstore`.`work` (`salesman_id`, `store_address`, `since`) VALUES ('2', '2170 33RD AVE, San Francisco, CA 94116', '2008-12-02');

INSERT INTO `bookstore`.`work` (`salesman_id`, `store_address`, `since`) VALUES ('3', '49 Ocean Ave, San Francisco, CA 94113', '2008-12-03');

INSERT INTO `bookstore`.`work` (`salesman_id`, `store_address`, `since`) VALUES ('4', '49 Ocean Ave, San Francisco, CA 94113', '2008-12-04');

INSERT INTO `bookstore`.`work` (`salesman_id`, `store_address`, `since`) VALUES ('5', '49 Ocean Ave, San Francisco, CA 94113', '2008-12-05');

/*insert data into write table*/
INSERT INTO `bookstore`.`writes` (`book_id`, `author_id`, `writes_year`) VALUES ('1', '1', '2010'); INSERT INTO `bookstore`.`writes` (`book_id`, `author_id`, `writes_year`) VALUES ('2', '2', '2011'); INSERT INTO `bookstore`.`writes` (`book_id`, `author_id`, `writes_year`) VALUES ('3', '3', '2000'); INSERT INTO `bookstore`.`writes` (`book_id`, `author_id`, `writes_year`) VALUES ('4', '4', '2005'); INSERT INTO `bookstore`.`writes` (`book_id`, `author_id`, `writes_year`) VALUES ('5', '5', '2006'); INSERT INTO `bookstore`.`writes` (`book_id`, `author_id`, `writes_year`) VALUES ('6', '6', '2007'); INSERT INTO `bookstore`.`writes` (`book_id`, `author_id`, `writes_year`) VALUES ('7', '7', '1999'); INSERT INTO `bookstore`.`writes` (`book_id`, `author_id`, `writes_year`) VALUES ('8', '8', '2010'); INSERT INTO `bookstore`.`writes` (`book_id`, `author_id`, `writes_year`) VALUES ('9', '9', '2000'); INSERT INTO `bookstore`.`writes` (`book_id`, `author_id`, `writes_year`) VALUES ('10', '10', '1988');

/*create index*/
CREATE INDEX firstChar ON author (author_name(1)); CREATE INDEX index_book_id ON book (book_id);

/*find how many books sold on 2011-01-01*/ SELECT B.buy_date, count(*)
FROM buy B
GROUP BY B.buy_date

HAVING B.buy_date = '2011-01-01' ;

/*find books under 30 dollars*/

SELECT B.book_name, B.price AS cheapestPrice FROM book B
GROUP BY B.book_name
HAVING B.price < 30;

/*Find book whose price is greater than that of some book name "Wonder"*/ SELECT *
FROM book B
WHERE B.price > ANY (SELECT B2.price

FROM book B2
WHERE B2.book_name= "Wonder");

/*Find names of book which wrote In year"2010":*/ SELECT B.book_name
FROM book B
WHERE B.book_id IN (SELECT W.book_id

FROM writes W
WHERE W.writes_year = "2010");

/*Find names of book which wrote In year"2000":*/ SELECT B.book_name
FROM book B
WHERE EXISTS (SELECT *

output:

FROM writes W
WHERE B.book_id = W.book_id AND W.writes_year = "2000");

book_name	cheapestPrice
Dairv of a Wimpv	7.5
I hope this reaches her in time	2.93
Leonardo da Vinci	14.88
Milk and Vine	3.79
Principles: Life and Work	11.47
The Wisdom of Sundavs	16.79
Wonder	6.37
Xanathar's Guide to Evervthing	29.97

writes_year	count(*)
2005	1
2006	1
2007	1
2010	2
2015	1

buy_date	count(*)
2011-01-01	1

book_id	book_name	price	isbn
1	Obama: An Intimate Portrait	30	0316512583
2	Principles: Life and Work	11.47	1501124021
3	Harrv Potter	111.83	0545044251
5	Dairv of a Wimpv	7.5	1419725459
7	Leonardo da Vinci	14.88	1501139150
9	Xanathar's Guide to Evervthing	29.97	0786966114
10	The Wisdom of Sundavs	16.79	125138060
NULL	NULL	NULL	NULL

book_name
Obama: An Intimate Portrait
Milk and Vine

book_name
Harrv Potter
Xanathar's Guide to Evervthing